

# **Final Report on the Portable Weather Station**

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<b>16 Abstract</b>  <p>This station was required to have air temperature, relative humidity, wind speed and direction, and pavement temperature sensors of similar quality to the traditional RWIS sensors, have an integrated solar powered battery system, and be trailer-mounted for ease of transport.</p> <p>The station was tested by the Iowa DOT for basic reliability and sensor performance for a month and a half in Ames, Iowa before being moved to near Osceola, Iowa in early February 2010 for further field testing and evaluation. DOT field maintenance staff was able to successfully set up the station with minimal instruction and found the station to be relatively intuitive in its installation. Air temperature, wind speed, and wind direction observations from the station were compared to a nearby RWIS station and had good agreement. Pavement temperature readings were compared to sites within 40 miles of the station, and the readings correlated. The station has had good reliability.</p>					
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### Portable Weather Station

In spring 2009 the Office of Maintenance requested proposals for a high-quality portable weather station that can be strategically relocated for summer projects and winter snow removal operations.

This station was required to have air temperature, relative humidity, wind speed and direction, and pavement temperature sensors of similar quality to the traditional RWIS sensors, have an integrated solar powered battery system, and be trailer-mounted for ease of transport. Vaisala, Inc. was awarded the contract out of seven eligible bidders.



The trailer-mounted portable weather station was received in December 2009. The station is equipped with four moveable solar panels, an electric 30-foot mast, an all-in-one wind, precipitation, air temperature, barometric pressure, and relative humidity sensor unit, a cabled soil/pavement temperature probe, and a non-contact infrared pavement temperature sensor. The sensors are removed for transport and are



stored in a cabinet on the trailer. The mast folds for transport and telescopes for custom height adjustment. The trailer is equipped with jacks for leveling and stabilization.

The station was tested by the Iowa DOT for basic reliability and sensor performance for a month and a half in Ames, Iowa before being moved to its operational assignment near Osceola, Iowa in early February 2010. DOT field maintenance staff was able to successfully set up the station with minimal instruction and found the station to be relatively intuitive in its installation. The air temperature, wind speed, and wind direction observations from the station were compared to a nearby

RWIS station and had good agreement. Air temperature differences were less than 0.5 °F on average, and differences in wind measurements averaged around 1.3 mph. Pavement temperature readings were compared to sites within 40 miles of the station, and the

readings correlated within reason, given the distance between the sites. The station has had good reliability and to this date it has not had an outage of more than an hour since its installation in Osceola in which the station was at fault.

A Vaisala technician visited the Osceola maintenance facility in March, 2010 to give training on its maintenance and installation and to inspect the station. The trailer-mounted station seems to be performing well and seems to have successfully fulfilled a portion of its winter duties. Data from the station are available online through the North American RWIS website, Clarus ([www.clarus-system.com](http://www.clarus-system.com)) and via the Iowa State University Iowa Environmental Mesonet (<http://mesonet.agron.iastate.edu>) . New observations from the station are pulled every 10 minutes.